FORENSIC MEDICINE & TOXICOLOGY

- Post Mortem Lividity: Glove and Stocking pattern
- Probable cause of death: Hanging

- Knot in judicial hanging is placed at **ANGLE OF MANDIBLE (LEFT SUBAURAL)** [Official position]

- The **most effective** position of knot in judicial hanging is placed at Below chin (**SUBMENTAL**).
  Causes: Hangman's # of Cx Vertebra
  Disadvantage- May slip

CAUSE OF DEATH IN DROWNING

1. **Disruption of pulmonary surfactant** → Wet drowning (Fresh/Salt)
2. **Ventricular fibrillation** → Fresh water drowning (Hemodilution → Hyperkalemia)
3. **Cardiac arrest** → Salt water drowning (Hemoconcentration → Hypernatremia)
4. **Laryngeal spasm** → Dry drowning
5. **Vagal inhibition** → Immersion syndrome/Hydrocution
6. **Electrolyte imbalance** → Wet drowning & secondary drowning

MEDICAL COUNCIL

- Issues warning notice (Code of conduct) to all the doctors at the time of registration
- Takes disciplinary action on doctors who violates the code of conduct
  - Warning
  - Penal erasure

1. Warning notice is issued to a registered medical practitioner for
a) Unethical Practice
b) Wrong diagnosis
c) Wrong treatment
d) None of the above

2. Warning is issued to a registered medical practitioner for
a) Unethical Practice
b) Wrong diagnosis
c) Wrong treatment
d) None of the above

3. Which one of the following is the disciplinary action for 'Professional Misconduct'?
a) Fine
b) Imprisonment
c) Penal erasure
d) Warning notice

4. Which of the following can be the disciplinary action for 'Professional Misconduct'?
a) Penal erasure
b) Warning notice
c) Both
d) None

5. Which of the following can be the disciplinary action for 'Professional Misconduct'?
a) Penal erasure b) Warning c) Both d)None

NOTES NEXT DOOR

Law does not consider the following doctrine in a charge of criminal negligence (PGI)

a) Contributory negligence
b) Error of judgement
c) Vicarious liability
d) Novus actus interveniens
e) Res ipsa loquitur

Criminal negligence cases against doctors can be booked under I.P.C. Section

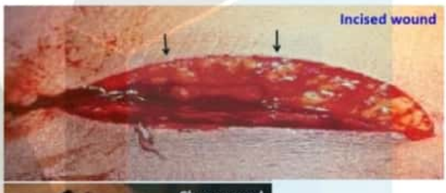
a) 341
b) 342
c) 352
d) Any of the above

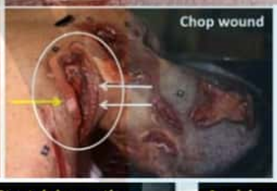
I.P.C. RELATED TO MEDICAL NEGLIGENCE

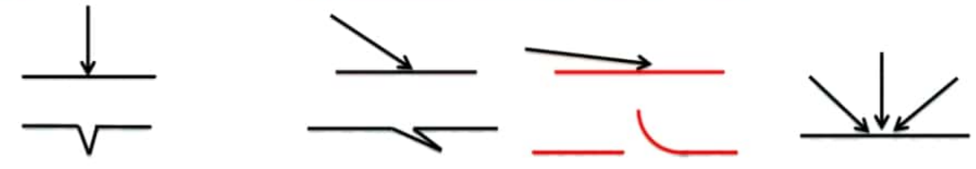
312 – 316 → Causing miscarriage
304A → Causing death by rash and negligent act
336 → Endangering life by rash and negligent act
337 → Causing hurt by rash and negligent act
338 → Causing grievous hurt by rash and negligent act
341 → Punishment for wrongful restraint
342 → Punishment for wrongful confinement
352 → Punishment for assault (Operation without consent)
269 → Negligent act likely to spread infection/disease dangerous to life
270 → Malignant act likely to spread infection/disease dangerous to life
284 → Negligent conduct with respect to poisonous substance

312. With consent
313. Without consent
314. Death of mother
315. Preventing the child being born alive or to cause it to die after birth
316. Causing death of quick unborn child by act amounting to culpable homicide

10







NOTES NEXT DOOR

2

LACERATED LOOKING INCISED WOUNDS:

- Over loose and wrinkled areas of the body:

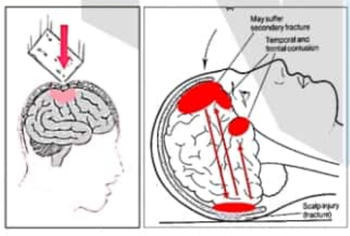
SHAPE OF STAB WOUNDS:

Triangular/wedge | Tear drop /Raindrop | Fish tailing | Spindle | Stellate/cruciate

Raindrop shaped wound is caused by

a) Ice pick
b) Kitchen knife
c) Screwdriver
d) Dagger

COUP AND CONTRECOUP INJURIES

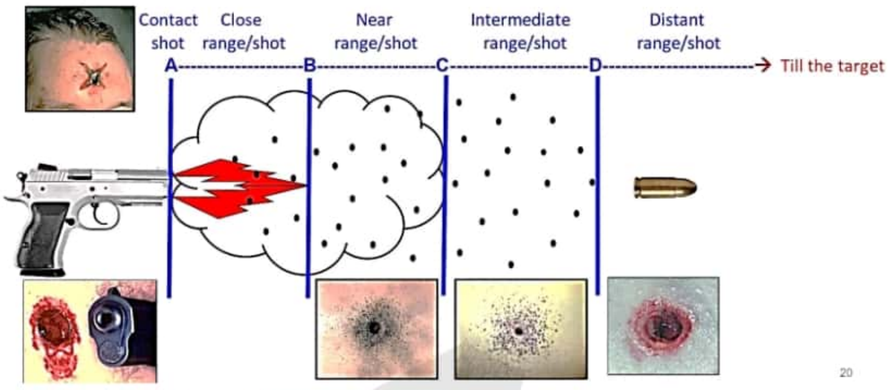


False statement in contrecoup injuries is

a) It is rare in children below 3 years
b) Most common site is frontal & temporal lobes
c) Fall on temporal area may produce contrecoup injury on ipsilateral lobe
d) Fall on frontal area produce contrecoup injury on occipital lobe

1. Coup and Counter-coup injuries are most common in frontal and temporal areas.
2. Counter-coup injuries are almost nil in occipital region
3. Counter-coup injuries are not seen in child <3 yrs

Counter-coup injuries may be seen the I/L lobe of the brain due to presence of falf cerebri between both the lobes.



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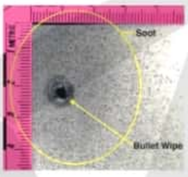
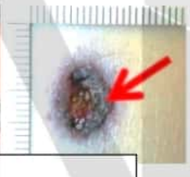




Dirt/grease collar or **Bullet wipe**
(Residue from the barrel)

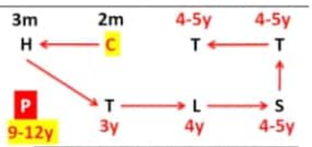
Fouling -> Bullet scrapings around w.o.e. seen within grease collar

What is true about bullet wipe?

a) Blackening around the wound of entry
b) Derived from the residue from the barrel of the gun
c) Gutter fracture of the skull caused by a bullet
d) Tattooing around the wound of entry

Bullet scrapings around the wound is known as

a) Smudging
b) Peppering
c) Fouling
d) Stippling



Age in years	No. of carpal bones
1	2
2	2
3	3
4	4
5	7
12	8

NOTES NEXT DOOR

4

What is the predicted bone age from the wrist radiograph given below

a) 18-19 years
b) 20-22 years
c) < 15 years
d) < 17.5 years

The maximum age of the person by the analysis of carpal bones in this X-ray is

a) 5 years
b) 7 years
c) 10 years
d) 13 years

Determine the age of the individual

a) 2 years
b) 4 years
c) 6 years
d) 11 years

Determine the age of the individual

a) 2 years
b) 3 years
c) 4 years
d) 5 years

MARBLING → Commences at about 24 hours, becomes prominent in 36-48 hours

Marbling is noticed by

a) 12 hours
b) 24 hours
c) 36 hours
d) 48 hours

- Filigree burns
- Lichtenberg flower marks
- Arborescent marks
- Keraunographic burns

Negative Autopsy:

- Int and Ext exam- Normal
- Histopath- No findings
- Chemical analysis – No
- No cause of death can be seen

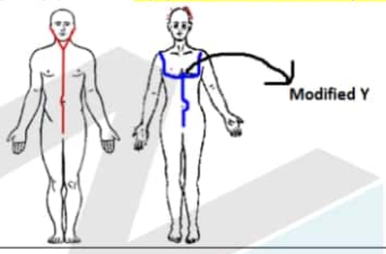
If the cause of death is unknown even after detailed examination and investigations, it is known as

a) Negative autopsy
b) Obscure autopsy
c) May be both
d) None

Obscured Autopsy: Minimal findings are present

The incision preferred during autopsy in case of asphyxia death due to neck compression is

a) 'I' shaped
b) 'Y' shaped
c) Modified 'Y' shaped
d) 'X' shaped



1. In routine autopsy, the body cavity to be opened first is
a) Head b) Chest c) Abdomen d) Choice of the dissector

2. In routine autopsy, the body cavity to be opened first in common usage is
a) Head b) Chest c) Abdomen d) Choice of the dissector

3. The body cavity to be opened first in head injury is
a) Head b) Chest c) Abdomen d) Choice of the dissector

4. The body cavity to be opened first in cyanide poisoning is
a) Head b) Chest c) Abdomen d) Choice of the dissector

5. The body cavity to be opened first in poisoning is
a) Head b) Chest c) Abdomen d) Choice of the dissector

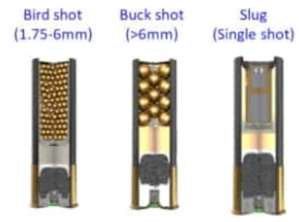
For DNA testing, which tissue sample is taken in an autopsy ?

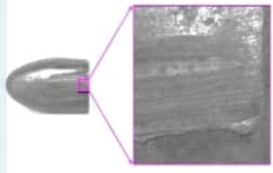
a) Liver
b) Spleen
c) Kidney
d) Muscle

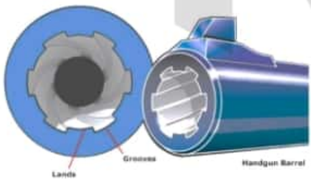
Fresh Body: Blood
Early decomposition: Muscle > Skin > Spleen> Bone

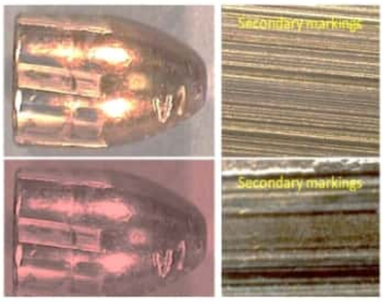
Smallest:

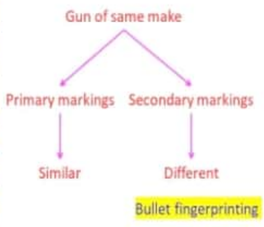
BEST SHOT (used to kill small animals)











Bullet fingerprinting is

a) Human fingerprints on bullet
b) Primary markings
c) Secondary markings
d) Distorted bullet

Bullet finger printings are

a) Primary markings
b) Secondary markings
c) Both
d) None

NOTES NEXT DOOR

7

The rifled firearm which has used for the purpose of crime can be identified by the

a) Primary characteristics
b) Class characteristics
c) Secondary characteristics
d) Tertiary characteristics

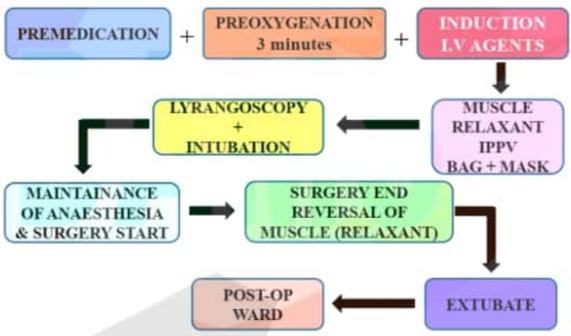
The primary and secondary markings over a metal bullet recovered from a body helps to

a) Know the range of firing
b) Identify the weapon
c) Know the severity of tissue damage
d) Know the crime

"La facies sympathique" is an expression used in hanging to describe

a) Bilateral dilatation of pupils
b) Bilateral constriction of pupils
c) Dilated pupil on the side of the knot
d) Dilated pupil on the opposite side of the knot

ANESTHESIA



- BEST CHOICE FOR SPONTAENOUS VENTILATION: MAGILL CIRCUIT OR MAPLESON A
- MOST INEFFECIENT CHOICE FOR CONTROLLED VENTILATION: MAPLESON A
- BEST FOR CONTROLLED VENTILATION : MAPLESON D
- SMOOTH AND RAPID INHATIONAL INDUCTION DONE WITH SEVOFLURANE
- MUSCLES RECOVERING BEFORE ADDUCTOR POLLICIS (M.C USED MUSCLE FOR MONITORING) ARE DIAPHGRAM, JAW, LARYNX, ORBICULARIS OCULI
- ALTERNATIVE TO SCOLINE FOR RAPID SEQUENCE INDUCTION IS ROCURONIUM
- VASOPRESSOR OF CHOICE FOR SPINAL/EPIDURAL HYPOTENSION IS PHENYEPINEPRINE
- SKELETAL MUSCLE RIGIDITY IS ASSOCIATED WITH HIGH DOSE OPOID ANESTHESIA WHICH IS USED FOR CARDIAC SURGERY
- FOR CYNOTIC HEART DISEASE & CARDIAC TAMPONADE KETAMINE IS THE CHOICE.
- ASTHAMATIC PTS AGENTS USED ARE KETAMINE, PROPOFOL, HALOTHANE, SEVOFLURANE
- BRONCHIAL BLOCKERS ARE ASSOCIATED WITH ONE LUNG VENTILATION
- DECREASED INTRACRANIAL COMPLIANCE OR ICP INCREASE SEVOFLURANE IS AGENT OF CHOICE. ALTERNATE IS ISOFLURANE
- BZD OF CHOICE IN NEUROANAESTHESIA IS MIDAZOLAM (SHORT DURATION)
- SCOLINE IS CHOICE FOR RSI IN FULL STOMUCH PTS
- CHOICE OF MUSCLE RELAXANT IN RENAL FAILURE, HEPATIC FAILRE IS CIS-ATRACURIUM.
- BETA BLOCKER OF CHOICE FOR INTRAOP IS ESMOLOL
- IN LIVER DISEASE AGENTS OF CHOICE IS ISOFLURANE AND SEVOFLURANE. THEY PRESERVE HEPATIC BLOOD FLOW AND OXYGEN DELIVERY
- IN EYE SURGERY ECG SHOULD BE MONITORED TO DETECT OCULO CARDIAC REFLEX. PRESENT IN CHILDEN AND CAUSE HYPERTENSION AND BRADYCARDIA.
- FOR HAEMODYNAMICALLY UNSTABLE PT CHOICE OF INDUCTION IS KETAMINE & ETOMIDATE
- FOR TRAUMA RESUSTICATION BLOOD PRODUCTS ARE FLUID OF CHOICE. PRBC:FFP:PLATELETS = 1:1:1

NOTES NEXT DOOR

- FOR LABOUR ANALGESIA CHOICE IS BUPIVACAINE (DIFFERENTIAL SENSORY BLOCKADE) 0.0625%-0.125% WITH OR WITHOUT OPOIDS
- LOCAL ANAESTHETIC INDUCED VENTRICULAR ARRYTHIMIAS T/t OF CHOICE IS AMIODARONE
- FOR PRE-ECLAMPSIA FIRST CHOICE IS EPIDURAL ANAESTHESIA.
- IN CHILDREN MUSCLE RELAXANT OF CHOICE IS ROCURONIUM (SUCCINYLCHOLINE IS AVOIDED DUE TO FEAR OF HIDDEN MUSCULAR DYSTROPHIES)
- MAINTAINCE FLIUD REQUIREMENTS ARE DETERMINED BY 4:2:1 RULE (FOR 1ST 10 KGS GIVE FLUIDS 4ML/KG, NEXT 10KGS 2ML/KG, AND >20KG GIVE 1 ML/KG). ADD UP AND MULTIPLE WITH FASTING HOURS.
- IN ELDERLY PTS DESFLURANE IS AGENT OF CHOICE FOR SPEEDING OF EMERGENCE (LOWEST BLOOD GAS COEFFICIENT)
- EPIDURAL NEEDLE 16-18 GAUGE, WITH GENTLE CURVE OF 15-30 DEGREES AT TIP, CALLED TUOHY NEEDLES- USED FOR EPIDURAL ANESTHESIA
- SPINAL NEEDLE IS 25 GAUGE MOST COMMONLY USED- THESE DAYS PENCIL TIP NEEDS ARE PREFFERED OVER NON-CUTTING NEEDLES SINCE THEY LOWER THE INCIDENCE OF POST-SPINAL HEADACHE.
- PROPOFOL IS AGENT OF CHOICE FOR DEEP SEDATION AND REDUCED POST OPERATIVE NAUSEA & VOMITTING, LIVER DISEASE, PORPHYRIA, DAY CARE SURGERY
- MOST COMMONLY USED FLUID INTRAOP IS RL
- FOR NEUROSURGERY, COMMONLY FLUID USED IS NORMAL SALINE
- CAPNOGRAPH IS BEST CHOICE FOR CONFIRMATION OF ENDOTRACHEAL TUBE
- LMA MAIN DISADVANTAGE IS DOES NOT PREVENT ASPIRATION SO NOT USED IN FULL STOMACH PATIENT.
- LMA SIZE DEPENDS UPON WEIGHT
- VENTURI MASKS ARE FIXED PERFORMANCE DEVICES
- MOST COMMON ARTERY USED FOR INVASIVE B.P MONITORING RADIAL ARTERY
- CVP CATHETER TIP LIES AT JUNCTION SVC AND RIGHT ATRIUM
- CMV IS USED FOR HEAD INJURY. S/E RESPIRATORY ALKALOSIS
- MODES ALLOWING FOR SPONTAENOUS VENTILATION ARE SIMV, IMV, PSV, HFV, APRV
- HFV
    - HIGH FREQUENCY POSITIVE PRESSURE VENTILATION
    - HIGH FREQUENCY JET VENTILATION (HVJV)
    - HIGH FREQUENCY OSCILLATIONS
- VENTILATION USED FOR EMERGENGY THROUGH CRICOTHYROID MEMBRANE IS HFJV
- ALLENS TEST IS RELATED TO ARTERIAL CANNULATION USED FOR BEAT TO BEAT BLOOD PRESSURE MONITORING
- pH OF 2.5 % THIOPENTONE IS 10.5 WITH SHELF LIFE OF 2 WEEKS
- FADE IS NOT SEEN WITH SCOLINE
- SCOLINE SHOULD NOT BE USED IN MASCULAR DYSTROPHIES
- SCOLINE IS MOST COMMON DRUG FOR CAUSING MALIGNANT HYPERTHERMIA

NOTES NEXT DOOR

- DRUGS USED FOR REVERSAL ARE NEOSTIGMINE, PYRIDOSTIGMINE, EDRAPHONIUM, PHYSOSTIGMINE
- BEST SIGN OF REVERSAL OF MUSCLE RELAXANT IS TOF RATIO OF >.9
- ASA GRADING IS USED TO ASSES PHYSICAL STATUS OF THE PT AND NOT FOR RISK ASSESSMENT
- HEPATITIS MOST COMMONLY OCCURS WITH HALOTHANE
- MOST IDEAL INHATIONAL AGENT IS XENON
- MOST CARDIOTOXIC LA IS BUPIVACAINE
- DOC FOR CPR IS ADRENALINE IV 1:10000
- FASTEST INDUCTION AGENT IS DESFLURANE
- EMLA IS MIXTURE OF 2.5% LIGNOCAINE+ 2.5% PRILOCAINE
- OXYGEN IS ALWAYS DOWNSTREAM OR CLOSER TO OUTLET IN ANAESTHESIA MACHINE
- FOR DAY CARE Sx SCORING SYSTEMS USED ARE ALDRETE SCORING AND PADS (POST ANAESTHESIA DISCHARGE SCORING SYSTEM)
- FOR ASA GRADE 1,2,3 ONLY MINIMAL INVESTIGATIONS TO BE DONE.
- FOR LSCS THE LEVEL REQUIRED IS T4 TO S5
- FOR ALL CARDIAC PROBLEMS IN PREGNANCY EPIDURAL IS THE CHOICE
- LOW DOSE ASPIRIN TO CONTINUE IN ALL Sx EXCEPT CLOSED SPACE Sx(BRAIN, SPINAL CORD,EYE).
- MOST COMMON HYPOXIA DURING ANAESTHESIA IS HYPOXIC HYPOXIA
- LA THAT IS DIFFERENT FROM ALL OTHER IS COCCAINE
- MOST INTIAL SIGN OF LA TOXICITY IS PERIORAL NUMBNESS.
- BLOOD :GAS SOLUBILITY COFFCIENT DETERMINES THE INDUCTION AND SPEED OF RECOVERY.IT IS INVERSLY PROPOTIONAL TO THEM
- PIN INDEX OF O2 IS 2,5 & NITROUS OXIDE 3,5
- CORRECT SEQUENCE OF SENSITIVITY TO LA IS Agamma>Adelta>Abeta=Aalpha>B>C
- POSITION OF LYRANGOSCOPY IS - EXTENSION AT ATLANTO- OCCIPITAL JOINT & FLEXION IN NECK
- DRUGS CAUSING PAIN ON INJ ARE PROPOFOL, ETOMIDATE, ROCURONIUM, DIAZEPAM.
- MOST COMMONLY USED CYLINDER WITH ANAESTHESIA MACHINE IS TYPE “E”
- GASES IN LIQUID FORM ARE N2O, CO2, CYCLOPROPANE

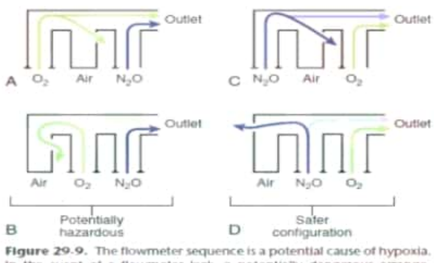


Figure 29-9. The flowmeter sequence is a potential cause of hypoxia. In the event of a flowmeter leak, a potentially dangerous arrangement exists when nitrous oxide is located in the downstream position (**A** and **B**). A safer configuration exists when oxygen is located in the downstream position (**C** and **D**). See text for details. *(Modified from Eger EI II, Hylton RR, Irwin RH, et al: Anesthetic flowmeter sequence: a cause for hypoxia,* Anesthesiology *24:396, 1963.)*

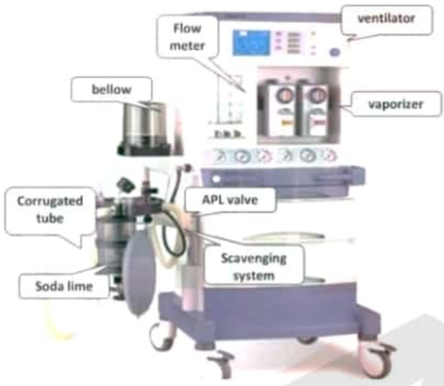


TABLE 3–2 Classification and characteristics of Mapleson circuits.

Mapleson Class	Other Names	Configuration[1]	Required Fresh Gas Flows: Spontaneous	Required Fresh Gas Flows: Controlled	Comments
A	Magill attachment	FGI → Breathing tube, Breathing bag, APL valve, Mask	Equal to minute ventilation (~80 mL/kg/min)	Very high and difficult to predict	Poor choice during cotrolled ventilaton. Enclosed Magill system is a modification that improves efficiency. Coaxial Mapleson A (Lack breathing system) provides waste gas scavenging.
B		FGI, APL valve	2 × minute ventilation	2–2½ × minute ventilation	
C	Waters' to-and-fro	FGI, APL valve	2 × minute ventilation	2–2½ × minute ventilation	
D	Bain circuit	APL valve, FGI	2–3 × minute ventilation	1–2 × minute ventilation	Bain coaxial modification: fresh gas tube inside breathing tube (see Figure 3–7).
E	Ayre's T-piece	FGI	2–3 × minute ventilation	3 × minute ventilation (I:E-1:2)	Exhalation tubing should provide a larger volume than tidal volume to prevent rebreathing. Scavenging is difficult.
F	Jackson-Rees' modification	FGI, APL valve	2–3 × minute ventilation	2 × minute ventilation	A Mapleson E with a breathing bag connected to the end of the breathing tube to allow controlled ventilation and scavenging.

[1]FGI, fresh gas inlet; APL, adjustable pressure-limiting (value).

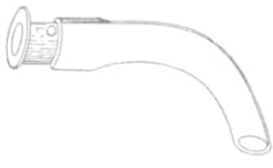


Fig. 6.23: Guedel's oropharyngeal airway

NOTES NEXT DOOR

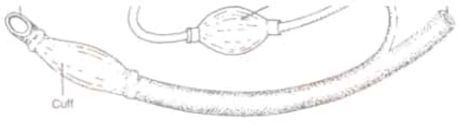
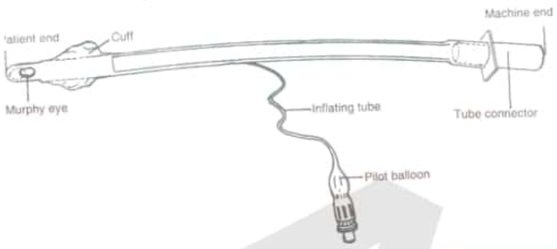
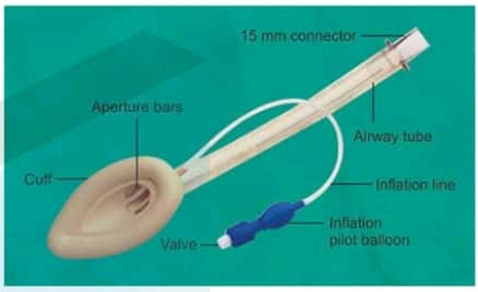


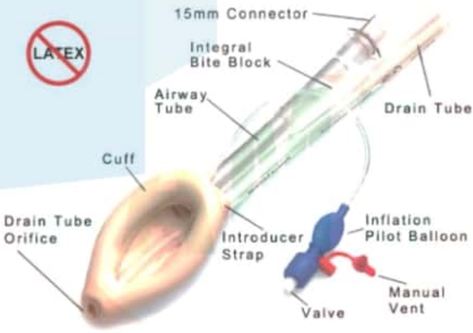
Fig. 6.18: Cuffed endotracheal tube (Red rubber)



Laryngeal Mask Airway (LMA)
[Latex Free]



Double Lumen LMA
Used for controlled ventilation



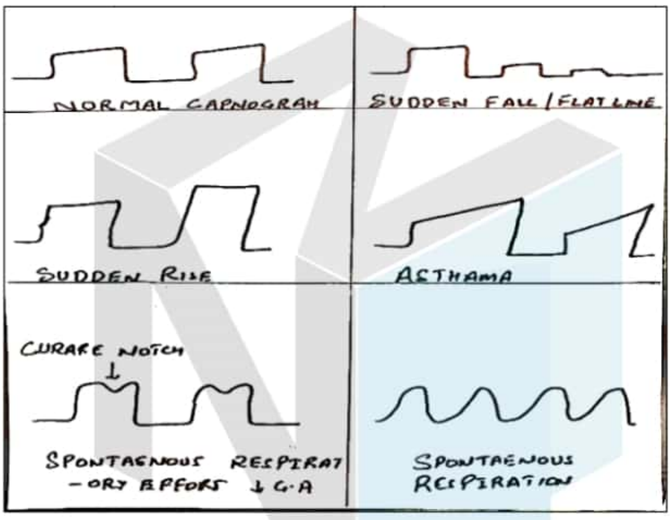
Double Lumen Tube

- Bronchial cuff + tracheal cuff
- Used for single lung ventilation
- Final position is confirmed by fibre optic bronchoscopy

NOTES NEXT DOOR

Different Types of Capnographs.

- Sudden Fall or Flat Line
  - Disconnection of the circuit (M/C)
  - Esophageal Intubation
  - Cardiac Arrest
  - Accidental Extubation
- Sudden Rise:
  - Malignant Hyperthermia
  - Thyroid Storm



NOTES NEXT DOOR

CARDIO PULMONARY RESUSICATION

GOALS

1. Maintain **oxygen and blood supply** to vital organs during cardiac arrest
2. Restore **spontaneous** circulation (Cardiac output during CPR with effective, uninterrupted chest compression is at **best 25% to 30%** of the normal spontaneous circulation.

(Normal Ejection Fraction = 55-65 %)

3. Minimize **post resuscitation organ injury**
4. Improve the patient's survival and **neurologic outcome**.

CHAIN OF SURVIVAL

- Identifies a sequence of **five critical actions** that increase survival rates from sudden cardiac arrest (SCA)

OUTSIDE HOSPITAL CARDIAC ARREST

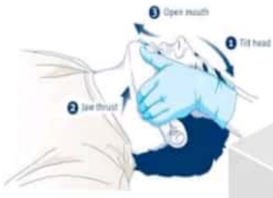
INSIDE HOSPITAL CARDIAC ARREST

NOTES NEXT DOOR

15

CPR IS AS EASY AS CAB
Compressions
Push hard and fast on the center of the victim's chest
Airway
Tilt the victim's head back and lift the chin to open the airway
Breathing
Give mouth-to-mouth rescue breaths

Age & site of pulse check in cpr



CATEGORY	AGE	SITE FOR PULSE CHECK
NEONATE	1ST 30 DAYS AFTER BIRTH	*PRECORDIAL AUSCULTATION\ 3 LEAD ECG*
INFANT	30 DAYS TO 1 YEAR AFTER BIRTH	***BRACHIAL** ARTERY*
CHILD	1YEAR TO PUBERTY	***FEMORAL\ CAROTID ARTERY***
ADULT \ ADOLOCENT	AFTER PUBERTY	***CAROTID ARTERY***

- PUBERTY: ***FEMALE:*** BREAST DEVELOPMENT +
  MALE: AXILLARY HAIR +

Table 1 BLS Dos and Don'ts of Adult High-Quality CPR

Rescuers Should	Rescuers Should ***Not***
Perform chest compressions at a rate of 100-120/min	Compress at a rate slower than 100/min or faster than 120/min
Compress to a depth of at least 2 inches (5 cm)	Compress to a depth of less than 2 inches (5 cm) or greater than 2.4 inches (6 cm)
Allow full recoil after each compression	Lean on the chest between compressions
Minimize pauses in compressions	Interrupt compressions for greater than 10 seconds
Ventilate adequately (2 breaths after 30 compressions, each breath delivered over 1 second, each causing chest rise)	Provide excessive ventilation (ie, too many breaths or breaths with excessive force)

Table 2 Summary of High-Quality CPR Components for BLS Providers

Component	Adults and Adolescents	Children (Age 1 Year to Puberty)	Infants (Age Less Than 1 Year, Excluding Newborns)
Scene safety	Make sure the environment is safe for rescuers and victim		
Recognition of cardiac arrest	Check for responsiveness No breathing or only gasping (ie, no normal breathing) No definite pulse felt within 10 seconds (Breathing and pulse check can be performed simultaneously in less than 10 seconds)		

NOTES NEXT DOOR

Component	Adults and Adolescents	Children (Age 1 Year to Puberty)	Infants (Age Less Than 1 Year, Excluding Newborns)
Activation of emergency response system	If you are alone with no mobile phone, leave the victim to activate the emergency response system and get the AED before beginning CPR Otherwise, send someone and begin CPR immediately; use the AED as soon as it is available	***Witnessed collapse*** Follow steps for adults and adolescents on the left ***Unwitnessed collapse*** Give 2 minutes of CPR Leave the victim to activate the emergency response system and get the AED Return to the child or infant and resume CPR; use the AED as soon as it is available	

Component	Adults and Adolescents	Children (Age 1 Year to Puberty)	Infants (Age Less Than 1 Year, Excluding Newborns)
Compression-ventilation ratio *without advanced airway*	***1 or 2 rescuers*** 30:2	***1 rescuer*** 30:2 ***2 or more rescuers*** 15:2	
Compression-ventilation ratio *with advanced airway*	Continuous compressions at a rate of 100-120/min Give 1 breath every 6 seconds (10 breaths/min)		
Compression rate	100-120/min		
Compression depth	At least 2 inches (5 cm)*	At least one third AP diameter of chest About 2 inches (5 cm)	At least one third AP diameter of chest About 1½ inches (4 cm)
Hand placement	2 hands on the lower half of the breastbone (sternum)	2 hands or 1 hand (optional for very small child) on the lower half of the breastbone (sternum)	***1 rescuer*** 2 fingers in the center of the chest, just below the nipple line ***2 or more rescuers*** 2 thumb–encircling hands in the center of the chest, just below the nipple line
Chest recoil	Allow full recoil of chest after each compression; do not lean on the chest after each compression		
Minimizing interruptions	Limit interruptions in chest compressions to less than 10 seconds		

DIFFERENCE IN ADULT AND PEDIATRIC CPR

POINT OF DIFFERENCE	ADULTS	CHILDREN\ INFANT
1: ACTIVATION OF EMERGENCY RESPONSE SYSTEM	1st: Activate ERS & get AED 2nd: Start CPR	**Witnessed collapse**: same as adult **Unwitnessed collapse**: 1st : 2 mins of CPR 2nd: leave the victim to active ERS
2: COMPRESSION TO VENTILATION RATIO **WITHOUT ADVANCED AIRWAY**	Always 30:2	1 rescuer: 30:2 2 rescuer: 15:2
3: DEPTH OF COMPRESSION	2 to 2.4 inches	Children: about 2 inches Infants: about 1.5 inches
4: HAND PLACEMENT	Lower half of sternum	Infants: 1 rescuer: 1 finger technique 2 rescuer: thumb encircling technique

NOTES NEXT DOOR

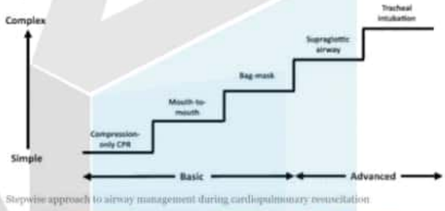
airway

- Bag-mask ventilation with a **head tilt–chin lift or head tilt–jaw thrust manoeuvre** is recommended for initial airway control in most circumstances.

- **Triple** manoeuvre: head tilt-chin lift , mouth open, jaw thrust

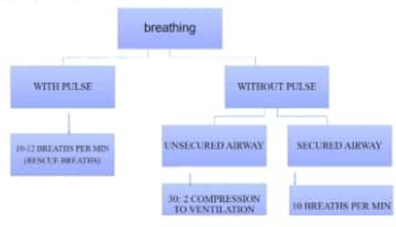
ADVANCED AIRWAY

- DEPENDING ON THE LEVEL OF EXPERTISE OF THE CPR PROVIDER
- ENDOTRACHEAL TUBE
- LARYNGEAL MASK AIRWAY
- COMBITUBE



Stepwise approach to airway management during cardiopulmonary resuscitation

- *" UNDER NO CIRCUMSTANCES SHOULD THE INSERTION OF ADVANCED AIRWAY COMPROMISE THE CHEST COMPRESSIONS"*



DEFIBRILLATION

- Delivery of an **electrical current** through the myocardium to interrupt disorganized cardiac activity and restore an organized cardiac rhythm
- **Monophasic** defibrillator :a **single 360 joule** (J) shock is delivered. (old – not used anymore)
- **Biphasic** defibrillator :(**120-200 J**) is usually sufficient to terminate the arrhythmia (new & better)
- If the rescuer is unfamiliar : **maximal available energy** should be used as the default energy
- **Pediatric patients**: 1st shock : 2-4 J\kg---subsequent shocks 4 J\kg (MAX 10J\kg)

DEFIBRILLATOR

AUTOMATED EXTERNAL DEFIBRILLATOR

(BASIC LIFE SUPPORT)

MANUAL DEFIBRILLATOR

(ADVANCED CARDIAC LIFE SUPPORT)

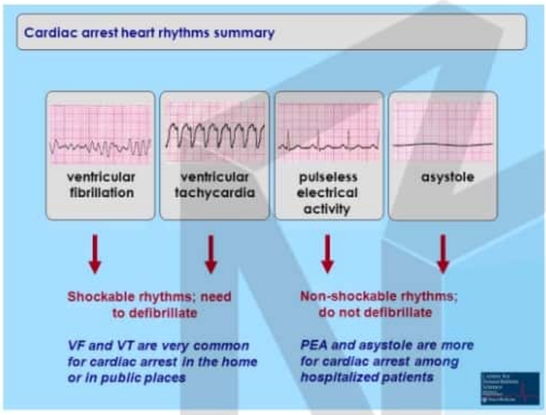
PLACEMENT OF ELECTRODES:

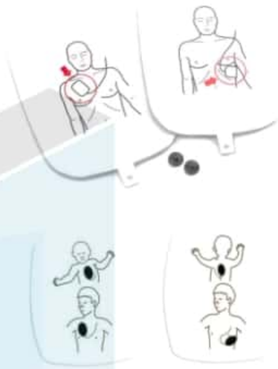
ADULT:

- **Upper right sternal border**, just below the clavicle
- Lateral to the **left nipple**.

CHILD OR INFANT :

- Anterior and Posterior.


Cardiac arrest heart rhythms summary
ventricular fibrillation
ventricular tachycardia
pulseless electrical activity
asystole
Shockable rhythms; need to defibrillate
Non-shockable rhythms; do not defibrillate
VF and VT are very common for cardiac arrest in the home or in public places
PEA and asystole are more for cardiac arrest among hospitalized patients

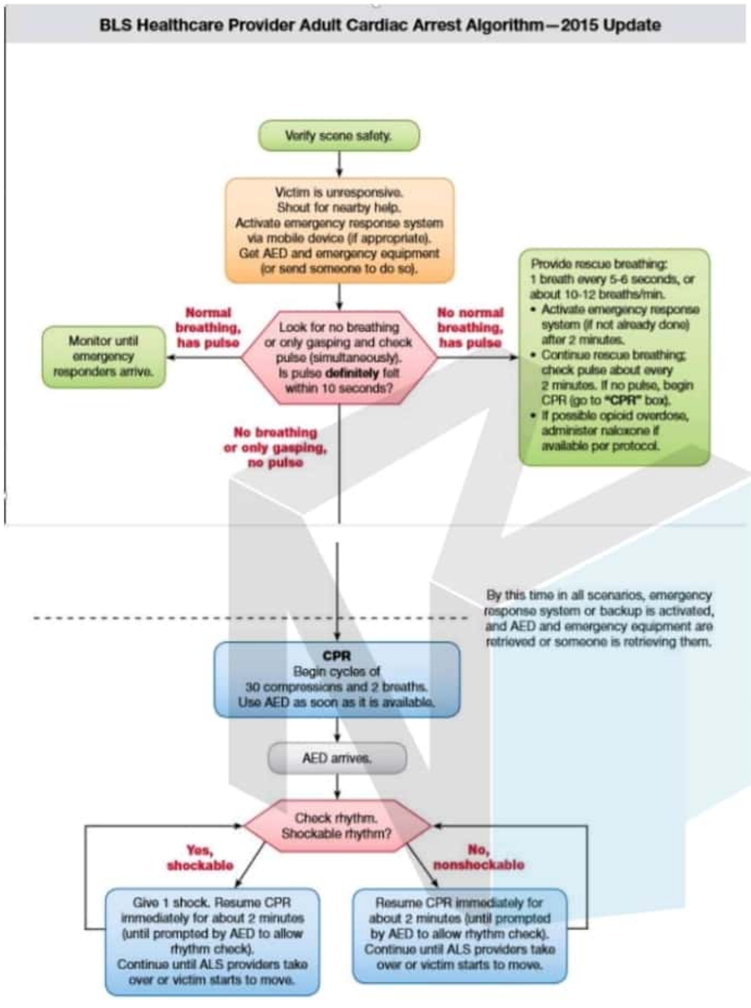


BLS & ACLS

BASIC LIFE SUPPORT	ADVANCED CARDIAC LIFE SUPPORT
CAN BE PERFORMED BY ANYONE	TRAINED MEDICAL \ PARAMEDICAL STAFF
RHYTHM IDENTIFICATION BY **AED**	RHYTHM IDENTIFICATION BY **RESUSICATOR**
AED FOR DEFIBRILLATION	MANUAL DEFIBRILLATOR
NO IV LINE \ DRUG USE	IV LINE AND DRUG MANAGEMENT
NO ADVANCED AIRWAY	ADVANCED AIRWAY USE
NO OXYGEN SUPPORT	OXYGEN SUPPORT

Most Common Cause of Cardiac Arrest in Adults: ASYSTOLE

NOTES NEXT DOOR

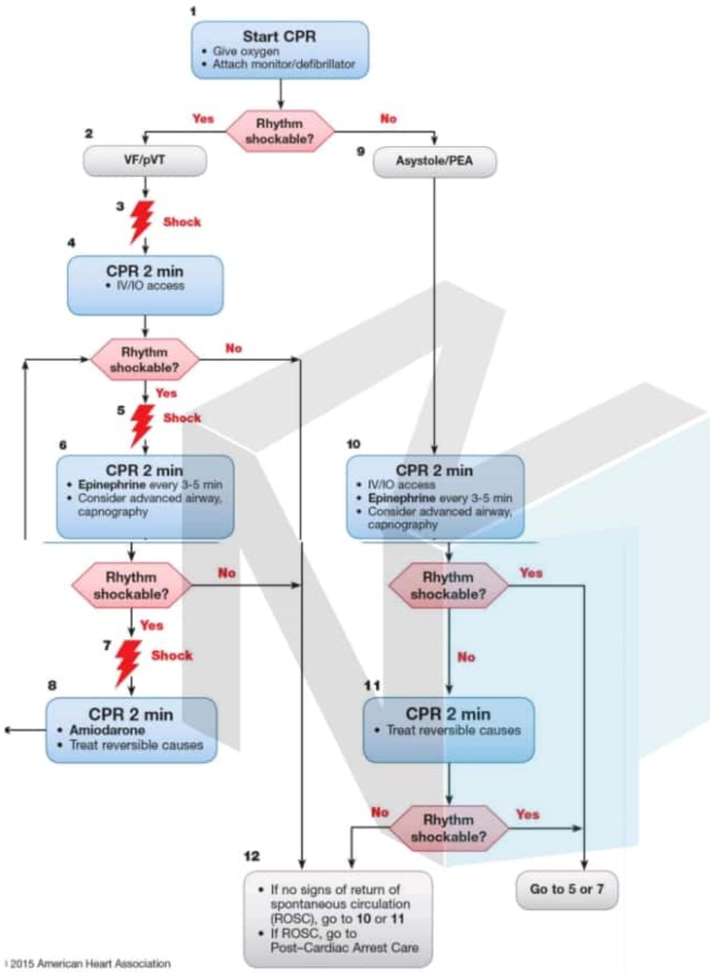

BLS Healthcare Provider Adult Cardiac Arrest Algorithm—2015 Update
Verify scene safety.
Victim is unresponsive.
Shout for nearby help.
Activate emergency response system via mobile device (if appropriate).
Get AED and emergency equipment (or send someone to do so).
Look for no breathing or only gasping and check pulse (simultaneously).
Is pulse definitely felt within 10 seconds?
Normal breathing, has pulse
Monitor until emergency responders arrive.
No normal breathing, has pulse
Provide rescue breathing:
1 breath every 5-6 seconds, or about 10-12 breaths/min.
• Activate emergency response system (if not already done) after 2 minutes.
• Continue rescue breathing; check pulse about every 2 minutes. If no pulse, begin CPR (go to "CPR" box).
• If possible opioid overdose, administer naloxone if available per protocol.
No breathing or only gasping, no pulse
By this time in all scenarios, emergency response system or backup is activated, and AED and emergency equipment are retrieved or someone is retrieving them.
CPR
Begin cycles of 30 compressions and 2 breaths.
Use AED as soon as it is available.
AED arrives.
Check rhythm.
Shockable rhythm?
Yes, shockable
No, nonshockable
Give 1 shock. Resume CPR immediately for about 2 minutes (until prompted by AED to allow rhythm check).
Continue until ALS providers take over or victim starts to move.
Resume CPR immediately for about 2 minutes (until prompted by AED to allow rhythm check).
Continue until ALS providers take over or victim starts to move.

ADVANCED CARDIAC LIFE SUPPORT

- TEAM OF TRAINED PROFESSIONALS
- COMPRISES OF DOCTORS, TRAINED PARAMEDICAL STAFF, NURSES
- **MEMBERS**: MINIMUM 6 AND MAXIMUM 10

✓1 TEAM LEADER
✓1 COMPRESSOR & 1 VENTILATOR (CHANGE ROLES EVERY 2 MINS)
✓1 DEFIBRILLATOR
✓1 INTRAVENOUS DRUG DELIVERY
✓1 TIME KEEPER

Adult Cardiac Arrest Algorithm—2015 Update



ROUTES OF ACCESS

INTRAVENOUS ROUTE	*INTRAOSSEOUS ROUTE*	*ENDOTRACHEAL ROUTE*
Intravenously push bolus injection	**Most common**: lower end of femur or upper end of tibia	least preferred
Flush with 20 mL of fluid or saline		Dose is 2-2.5 times the iv dose
Raise extremity for 10 to 20 seconds to enhance delivery of drug to circulation		5 drugs:(NAVAL) Naloxone Adrenaline Vasopressin Atropine Lignocaine

NOTES NEXT DOOR

DRUG THERAPY IN CPR

EPINEPHRINE	AMIODARONE
ADULT: 1.0 mg (1:10000) IV or 2 to 2.5 mg (1:1000) ETT every 3 to 5 min	**VF/pulseless VT** / VT with pulse /Tachy rate control
Pediatric: 0.01-0.03 mg\kg	VF/VT: 300 mg dilute in 20 to 30 mL, may repeat 150 mg in 3 to 5 min
	Do not administer via the ET tube route

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

POST CARDIAC ARREST CARE

THERAPEUTIC HYPOTHERMIA

- Recommended for comatose individuals with return of spontaneous circulation after a cardiac arrest event.
- Individuals should be cooled to 89.6 to 93.2 degrees F (32 to 36 degrees C) for at least 24 hours.

OPTIMIZATION OF HEMODYNAMICS AND VENTILATION

- 100% oxygen is acceptable for early intervention but not for extended periods of time.
- Oxygen should be titrated, so that individual's pulse oximetry is greater than 94% to avoid oxygen toxicity.
- Do not over ventilate to avoid potential adverse hemodynamic effects.
- Ventilation rates of 10 to 12 breaths per minute to achieve ETCO2 at 35 to 40 mmHg.
- IV fluids and vasoactive medications should be titrated for hemodynamic stability.

Foreign Body Obstruction- Heimlich Manoeuvre (for >= 1yr)

Only if the patient is awake and chocking... else BLS

Place the infant stomach-down across your forearm and give five quick, forceful blows on the infant's back with heel of your hand